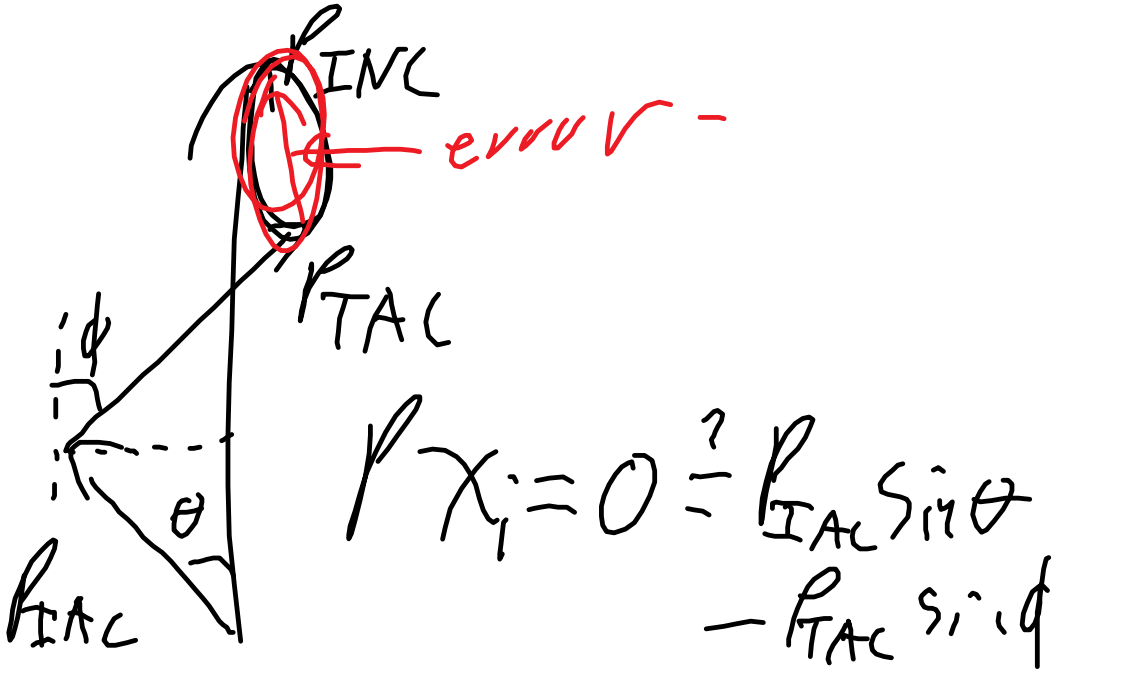
Momentum lab
scale momentum diagram
1cm = 100gcm/s?
p=ms/t t= Sqrt(2x0.915/9.81)=0.4319s
momentum of the system before the collision is the momentum of the incident ball, no collision
compare to the vector sum (scale diagram and components) of the two balls after the collision



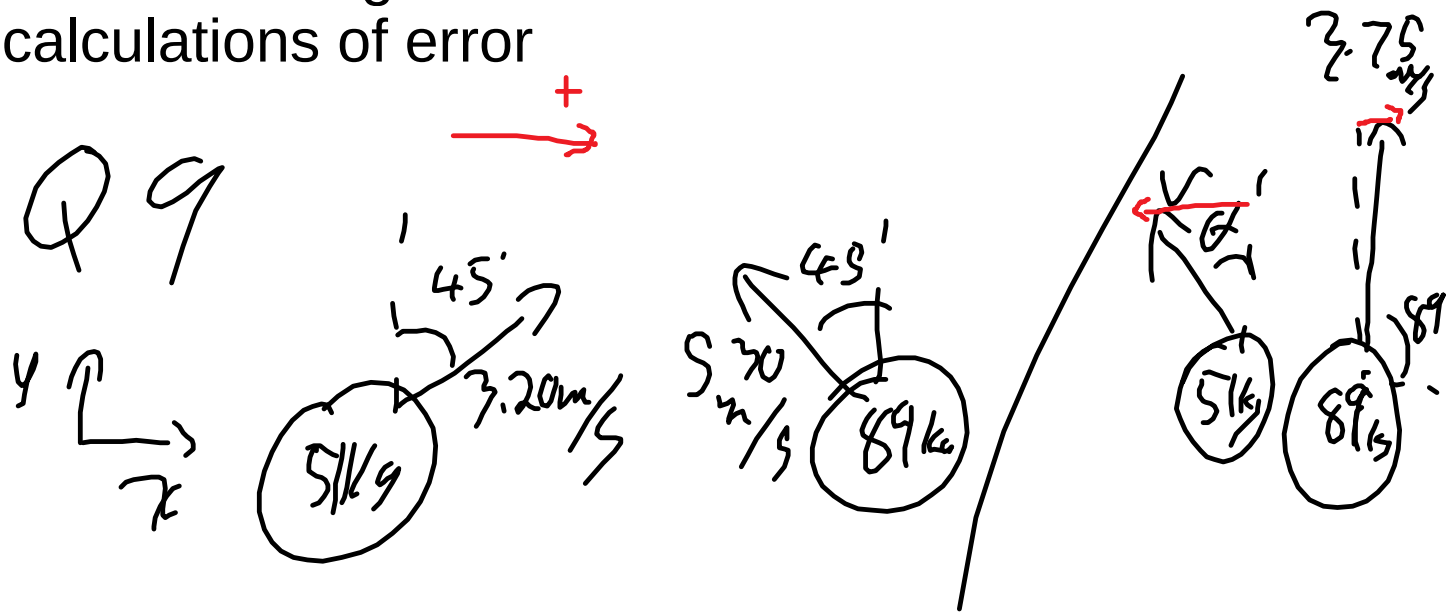
$$P_{x_i} = 0 \stackrel{?}{=} P_{IAC}\sin\theta - P_{TAC}\sin\phi$$

$$P_{y_i} = P_{INC} - P_{IAC}\cos\theta - P_{TAC}\cos\phi$$

$$error \approx \sqrt{x_{error}^2 + y_{error}^2}$$

p27-28 Q1, 4, 5, 9, 11 along

with the 2 diagrams and 2 calculations of error



χ (51x3.2xCos(45))-(89x5.3xCos(45))=-218.14244199605

= 51xv_x + 89x3.75xCos(89)= 5.824740648443327

51v_x = -218.14-5.8247=-223.9647

v_x = -223.9647/51=-4.3915

y-components - everything is + (North)

(51x3.2xSin(45))+(89x5.3xSin(45))= 448.942095375339

= 51xv_y + 89x3.75xSin(89)= 333.6991682584456

51v_y = 448.942095375339-333.6991682584456 =115.2429271168935

v_y = 115.24/51=2.2596

v = Sqrt(2.2596^2+4.3915^2)= 4.938731052608554

θ= Atan(4.3915/2.2596)=62.7723924585267 1

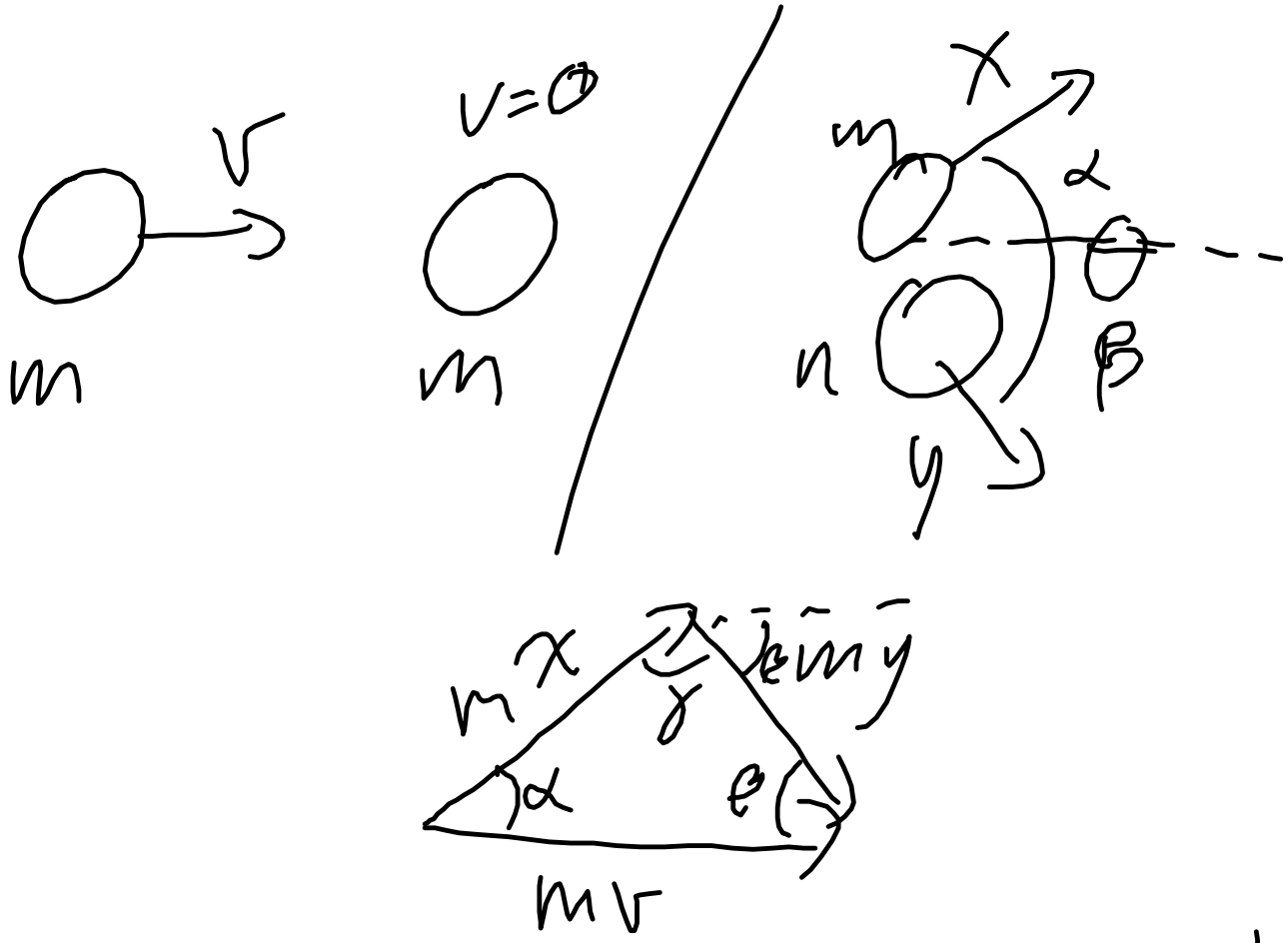
so her velocity is 4.94m/s 62.8º West of North

Was the collision perfectly elastic?
is kinetic energy conserved? (no vectors)
$1/2mv^2+1/2mv^2 =? 1/2mv^2+1/2mv^2$
(0.5x(51)x(3.2)^2)+(0.5x89x5.3^2)=1,511.125 J

(0.5x(51)x(4.94)^2)+(0.5x89x3.75^2)=
1,248.0731

1511-1248=263 J of energy lost

so the collision was not perfectly elastic



$\frac{1}{2}mv^2 = \frac{1}{2}mx^2 + \frac{1}{2}my^2$ elastic

$r^2 = x^2 + y^2$ ← Pythagorus

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$\gamma = 90°$

$\alpha - \beta = \theta$

$\therefore \theta = 90°$